

Space News Roundup

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No. 31



NASA Electronic Photo

STS-43 Mission Specialist Shannon Lucid reacts with a thumbs-up as Pilot Mike Baker and Mission Specialist David Low congratulate her for setting a record as the woman with the greatest number of space flights — three. By the end of the mission, she should also be the woman with the most hours in orbit, about 505.

Achieving excellence in space

Panel to look at human resources perspective

Human resources managers from JSC and several of its top aerospace contractors will gather next Friday in Teague Auditorium to discuss how their organizations promote, manage and reward excellence.

The theme of the panel discussion, sponsored by JSC's Asian Pacific American Program, is "Achieving Excellence in Space Activities: The Human Resources Perspectives."

Participants will include Harvey Hartman, JSC director of Human Resources; Brian R. Dalton, manager of Personnel Planning and Organizational Development for Loral Space Systems; Dennis Carvalho, director of Quality Systems and Human Resources for McDonnell Douglas Space Systems; Eugene H. Clay, manager of the Human Resources Program at Lockheed Engineering and Sciences; Patricia

records, director of Human Resources and Affirmative Action at CAE-Link Corp.; and Dean Richman, manager of Training and Development for Unisys Corp.

A cultural program, including ethnic dances, music and a presentation of traditional bridal costumes of Asian Pacific ethnic groups, will follow the panel discussion.

All JSC employees are invited to attend as their work loads permit.

Atlantis crew deposits TDRS; returns science

By Kelly Humphries

With a fourth Tracking and Data Relay Satellite successfully deposited on orbit and volumes of science data on record, the crew of Atlantis will soon begin preparing for its first planned Florida landing in six years.

Commander John Blaha, Pilot Mike Baker and Mission Specialists Shannon Lucid, David Low and Jim Adamson blasted off on their nine-day mission from Kennedy Space Center's Launch Pad 39A at 10:02 a.m. Sunday, and got the mission off to an almost trouble-free start that continued through Thursday.

Landing is scheduled for 7:24 a.m. CDT Sunday at KSC's Shuttle Landing Facility, weather permitting. Whenever and wherever *Atlantis* lands, the crew return ceremony at Ellington Field should take place about 9 1/2 hours after touchdown. Employees are invited to attend the welcome home ceremony outside Hangar 990. Based on a nominal landing, the crew will return to JSC about 4:45 p.m. Sunday.

TDRS-E, which will become a primary shuttle communications satellite after a 60- to 90-day checkout, sprang out of the payload bay at 4:15 p.m. CDT Sunday. The inertial upper stage boosted the communications satellite into geosynchronous transfer orbit an hour later. By 10:30 p.m., a second IUS burn had circularized

TDRS's orbit and ground controllers began unfurling the satellite's antennas and preparing it for use as TDRS-West at 174 degrees longitude.

It wasn't long before the crew began its complement of long-duration space flight experiments, activating the Bioserve ITA Materials Dispersion Apparatus to look at biomedical manufacturing methods, studying the development of polymer membranes in microgravity, measuring the variability of blood pressure during space flight and testing ways of helping the body readapt to Earth's gravity with the Lower Body Negative Pressure experiment.

The crew also examined new technologies for the future of space flight, seeing how much heat and jostling the Space Station Advanced Heat-pipe Radiator Element (SHARE-II) would take before it had to be reprimed, garnering experience with a new method of transmitting data to space walking astronauts or payloads in the cargo bay with the Optical Communications Through the Window, and trying out personal computer communication and cursor control devices.

Commander Blaha emphasized the importance of the biological and technological experiments as pathfinders for Space Station *Freedom*.

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Shuttle integration combines three offices into two

By James Hartsfield

To streamline operations and better suit the space shuttle launch manifest now in place, the Space Shuttle Integration and Operations Office has been reorganized.

"Based on the manifest we're dealing with now, not having a lot of Department of Defense-dedicated flights upcoming, we've combined three offices into two," Deputy Manager Jim Smotherman said. "The reorgani-

zation was precipitated by the fact that we wanted to handle Space Station *Freedom* integration via our normal method of handling payloads from now on as well. So we dissolved the Space Station Integration Office."

The reorganization did not involve any personnel changes other than reassigning the three workers that staffed the space station office into other areas of the shuttle integration office, Smotherman added.

John C. O'Loughlin, former manager of the Space Station Integration Office, is now deputy manager of the Customer Integration Office.

Areas within the office now include: the Integration Management Office, managed by Michael Corbin; the Customer Integration Office, managed by David Grissom; the Attached Payloads Office, managed by Richard Swalin; the Deployable Payloads Office, managed by David DeAtkine;

the Cargo Engineering Office, managed by Larry Bell; the Payload Integration Engineering Office, managed by George Sandars; the Engineering Products Office, managed by Ronny Moore; the Engineering Assurance Office, managed by Gerald P. Kinney; the Mission Integration Office, managed by Edwin Hoskins; the Flight Integration Office, managed by George Niell; and the Manifest and Performance Office, managed by

Richard Matthews.

Skip Larsen serves as manager for Space Station *Freedom* payload safety, and William Reeves is manager for Space Station *Freedom* integration. Hal Lambert remains manager of the Shuttle Integration and Operations Office.

"The reorganizing should streamline our processes and the functions we'll serve over the next few years," Smotherman said.

Space station evolution begins today, Lenoir tells conferees

By Kyle Herring

Eventual evolution of Space Station *Freedom* from the baseline configuration begins today said JSC Director Aaron Cohen and Office of Space Flight chief William Lenoir as they kicked off a conference Monday at South Shore Harbour.

Lenoir, keynote speaker at the "Space Station Evolution: Beyond the Baseline" conference, challenged attendees to move forward with the program as it is currently designed.

"We cannot be afraid to move forward with something that's less than perfect. If (we stopped) every time we discovered a better way to do something we would

never get off the drawing board. We would still be talking about going to the Moon," he said.

Cohen, in opening remarks, likened the struggles with the space station program to those of previous space projects.

"During the past year we have been going through the birth pangs of a new project not unlike those we experienced at the beginning of Apollo and shuttle," he said.

Budget problems, intense public debate, technical issues and schedule slips are nothing new to NASA, he said.

"Those pangs in the birth of a program are really nothing different

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JSC Photo by Mark Sowa

Dr. Earle K. Huckins III of NASA Headquarters, left, discusses space station issues with JSC's program chairman, Mark Gersh, in the lobby of the South Shore Harbour Resort and Conference Center. Huckins was chairman of the "Space Station Evolution: Beyond the Baseline" conference Monday and Tuesday.

JSC updates space station work package

By Pam Alloway

JSC has updated its agreement with McDonnell Douglas Space Systems Co. for the Space Station Work Package 2 design, development, test and evaluation contract.

The modification adjusts the contract to include the results of the Space Station *Freedom* Program review activities of 1988 and 1989. The Huntington Beach, Calif., company will adhere to requirements changes resulting from the Program Requirements Review of 1988, and the Program Technical Audit and Space Station *Freedom* Program Configuration Budget Review of 1989.

The reviews added 17 months to the Work Package 2 effort, extending it to June 30, 2000 and

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JSC

Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.
 General Cinema (valid for one year): \$4.
 AMC Theater (valid until May 1992): \$3.75.
 Loews Theater (valid for one year): \$4.
 Astroworld (valid 1991 season): season, \$44.94; child less than 4-feet, \$10.12; one day, \$15.85; WaterWorld, \$8.15.
 SeaWorld of Texas (valid 1991 season): child (3-11), \$12.25; adult, \$17.25; (2-day) child \$15.95; adult, \$21.95.
 Six Flags (valid until Nov. 17): adult (1 day) \$15.95, (2-day) \$20.95; child under 4 feet, \$14.95.
 NASA Ski Week (Jan. 4-11, Big Sky Montana Resort, includes airfare, shuttle transfers, 6 day lift pass, 7 nights lodging): 2/Rm. \$744/person; 3/Rm. \$685/person; 4/Rm. \$656/person; \$100 deposit due by Aug. 15.

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Gilruth Center News

Sign up policy—All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

Defensive driving—Course is offered from 8 a.m.-5 p.m., Oct. 12 or Nov. 16. Cost is \$15.

Aerobic dance—High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$24.

Exercise class—Low-impact class meets from 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

Weight safety—Required course for employees wishing to use the Gilruth weight room. The next classes will be from 8-9:30 p.m. Aug. 22, Sept. 5 and Sept. 18. Cost is \$5; preregistration required.

Country and western dancing—Beginning class will meet from 7-8:30 p.m. Mondays, starting Sept. 9; intermediate class meets from 8:30-10 p.m. Mondays beginning Sept. 9. Cost of six-week course is \$20 per couple.

Tennis—Beginning tennis class meets Mondays for six weeks starting Aug. 12. Advanced beginners class meets Wednesdays beginning Aug. 14. Cost is \$32.

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Technical Library News

The following selection is available in JSC's Technical Library, Bldg. 45, Rm. 100.

International Workshop on Meteorite Impact on the Early Earth. The Institute, 1990. QB 754.8 .I57 1990.

JSC

Swap Shop

Property

Rent: Enclosed RV storage stall, 40' deep, lights/power, reasonable. 482-9396.

Rent: Webster, 1BR condo, furnished, W/D, fans, A/C, pool, tennis ct., assign pk/carpot, patio, carpet, avail 8/1/91, \$500/mo. Phyl, 286-6256.

Rent: Pearland, 3-2-2, 1.8K sq ft, fans, skylight in LR, lg fenced yard, no pets, \$650/mo plus dep. x34771 or 480-9036.

Sale: LC, 3-2-2, no MUD taxes, assum, no approval, never flooded, \$62K. 538-2299.

Lease: Webster/Ellington, 2-1-condo, \$435/mo. Dave, x38156 or Herb, x38161.

Sale: Wimberley, TX, two beautiful hill country homes on Blanco River. Sharon, 333-5848.

Sale: Woodcreek, 3-2-2, custom brick, lg rooms, no formals, garage dr openers, FPL, covered patio. x37256 or 485-7607.

Lease: University Green, 2-2-2 patio home, hot tub, decking, W/D, Jenn-Aire island, walking distance to pool and tennis, \$975/mo. x34181 or 286-6254.

Sale: Friendswood, Wedgewood Village, two residential lots, 1/3 acre ea, \$12.5K/ea. 482-5226.

Sale/Lease: Dickinson 3-2-2, lg LR, fenced yard, assum, avail August. 538-1217.

Lease: Nassau Bay, 4-2-5-2, FPL, lake waterfront, 3000 sq ft, avail Oct 1, \$2K/mo. Phil, x37892 or 333-9518.

Sale: Lot in Pearland, Dixie Hollow subdivision, all util, concrete street. x39530 or 482-5003.

Sale/Lease: Heritage Park, 4-2-2, 1.8K sq ft, FPL, refrig, dishwasher, W/D, fans, tiles, \$695/mo, \$69.5K, incl 19' Welcraft leisure ski boat, w/125hp motor, avail 8/19/91. 333-6458.

Lease/Sale: Sterling Knoll, 5-2-5-2, 2 story, FHA 9%, assum, \$948K OBO. Walter, 282-6766.

Rent: Galveston condo, Seawall Blvd & 61st Street, furnished, sleeps six, cable TV, swimming pools, wkly/Mk-end/dly rates. Magdi Yassa, x38470 or 486-0788.

Cars & Trucks

'80 Toyota Corolla wagon, 107K mi, good cond, \$950. Joyce, 335-2522 or Pete, 691-4347.

'84 Camaro, V6, 5 spd, A/C, blk, 37K mi, new tires and battery, ex cond, \$3.9K. Karon, 244-9664.

'86 Cadillac Fleetwood Brougham, loaded, ex cond, 63K mi, \$10K. 488-7387.

'89 Honda Prelude Si, sky blue, 5 spd, 28K mi, ex cond, alum wheels, alarm, \$12.5K. 480-9125.

'87 Olds Cutlass Supreme, 2 dr hardtop, dk blue w/dk blue vinyl top, 54K mi, 305-V8, loaded, ex cond, \$7.8K. Carole, x34440 or 946-6242.

'90 Acura Integra LS, blue/green, 4 dr, auto, safety dcs, cruise, tilt wheel, \$12.5K. x30063 or 331-2721.

'83 Toyota pickup, wht, 4 spd, reliable, A/C, high mi, some rust, \$1.8K. x33005 or 338-2517.

'81 Olds Cutlass Supreme, 2 dr, blown head gasket, \$750 OBO. x31409 or 488-0182.

'66 Classic VW bug, collector's item, all orig, turquoise w/blk int, recently upgraded 6 volt to 12 volt system, AM/FM/cass, runs great. \$2K. Gary, 479-0306.

'89 Jeep Wrangler, blk/gray, 4x4, AM/FM, 23K mi, \$7.5K. Mike, 326-5100.

'79 Fiat Spider, ex cond, low mi, \$4.5K. Bill, 283-6532 or 486-0581.

'74 Ford pickup, 74K mi, runs great, floor 3 spd, rack and tool box, \$1.6K OBO. Bill, x38378 or 992-5415.

'84 Celebrity wagon, eng good, needs brake work. 944-9752.

'79 VW Pop-Top camper, rebuilt eng and brakes, \$3.9K. David, 929-7120 or 332-9044.

'88 Honda Prelude Si, 4WS, 5 spd, 69K mi, \$9K. Jim, 997-2069.

'83 Honda Accord, 4 dr, 5 spd, AM/FM/cass, A/C, good cond, \$1.8K; '81 Dodge Ram Charger, 4WD, 4

spd, AM/FM/cass, 64K mi, \$2K. 244-7272 or 326-3449.

'76 300D Mercedes, A/C, SR, all pwr options, \$2.4K OBO or may swap for boat or small pickup truck. Jerry, x39287.

'81 Dodge Colt, wrecked, no head on eng, sell for parts or all for \$300. Herman, x35095.

'81 Plymouth Reliant, 2 dr, 4 spd, clean, BO under \$500. 334-3896.

'73 MG Midget, good cond, new body work/needs painting, \$995. Katie, 282-4262 or Bob, 471-6254.

'80 Olds Cutlass Supreme Broughm, needs int work, runs good, \$800 OBO. Steve, x32236.

'79 Delta 88, good cond, \$450. 992-4566.

'89 Honda Civic LX, 4 dr, P/W, P/D, P/B, P/S, AM/FM/cass, A/C, new tires, ex cond, \$8K. Jay x35814 or 992-3149.

'90 GMC Sierra ST, 350 engine, blk w/red pin stripes, 48K mi, loaded. Mike, 326-5100.

'85 Chrysler New Yorker, gun metal blue, 4 dr, 2.2L turbo, loaded, 71.5K mi, \$4.5K. 946-7587.

'84 Chevy Suburban, C10 Silverado, loaded, \$6.5K. 488-4915.

'80 Mazda 626, gold, standard, 4 cyl, Pioneer sound sys, ex cond, \$1.8K. Larry, x30428.

'84 Audi, 4 dr, loaded, leather int, loaded, ex cond, \$2,950. 776-2375.

'82 Volvo 240 DL, 4 dr, 4 spd, 4 cyl, A/C, P/B, P/S, ex cond, \$2,950. 339-1957.

'89 GMC Suburban, loaded, ex cond, dual air cond. 852-8622.

'79 Subaru 4/WD wagon, needs motor. Rusty, x35981 or 649-8816.

Cycles

Motorcycle leather suit, medium, blk Dainese 1-piece w/knee scraper pads and nylon safety inserts, was \$550, now \$200. Doug, 480-3011.

'84 Honda XL200R, good cond, \$500. Frank, x39924 or 992-3515.

Bianchi 27 in, 10 spd bike, red, ex cond, \$150 OBO. Randy, 333-6568.

'86 BMW K75 750cc motorcycle, blk, 17K mi, whelmet, new tires, new battery, \$2.5K OBO. Ken, 332-5450.

Yamaha 1100 Cruiser, ex cond, \$1.2K or trade for equal car or truck. 339-7337.

Boats & Planes

'84 31 ft, Chris Craft Sportsman, twin Mercruiser engines, low eng hrs, shower, toilet, refrig, sleeps 6, ex cond. 339-1197.

Aircraft propeller, Senenish 74DM6-0-58, overhauled, yellow tag, fits some Beech, Piper, PA-18, 22, 28 series aircraft, \$900. 538-2299.

'77 J-24 racing sailboat, totally restored, new hardware, rigging, rudder, keel failed to min, trlr coated w/zinc and paint, 4hp Evinrude, \$11.5K. David, 929-7120 or 332-9044.

'75 18 ft Crest Liner 140 AIAO Mercruiser, less than 60 hrs on motor and out drive, seats 8, ex cond, \$2.8K. Mike, 326-5100.

Audiovisual & Computers

Pair of Altec A-7 speakers, floor mon, 15 in woofer and 12 in horn in each, \$400. Blake, 337-2521.

IBM compatible computer, 20 MB HD, 12 in monochrome mon, 640K RAM, one 5.25 in floppy, Epson LX-800 printer, \$499 OBO; Sears elec typewriter, \$50 OBO. 334-2081.

Sony video picture computer, JVC special FX generator, Panasonic B/W 19 in mon, Apple II mocking board, Rusty, x35981 or 649-8816.

Stereo equipment, all pieces sold separately or together. Ken, 992-5210.

Apple II Plus w/monochrome mon, Appleworks SW, \$300; Imagewriter II printer, \$300; Both, \$500.

JSC

Dates & Data

Today

Cafeteria menu — Special: Salisbury steak. Entrees: fried shrimp, deviled crabs, ham steak. Soup: seafood gumbo. Vegetables: buttered carrots, green beans, June peas.

Monday

AIAA meets — The American Institute of Aeronautics and Astronautics' Engineering Management Technical Committee will meet at 11:30 a.m. Aug. 12 in the Bldg. 3 cafeteria. Charles Dalton and John Hunsacker of the University of Houston will speak about graduate engineering education. Call Susan Voss at x34841 for more information.

Cafeteria menu — Special: hamburger steak. Entrees: beef Burgundy over noodles, fried chicken. Soup: cream of chicken. Vegetables: buttered corn, carrots, green beans.

Tuesday

Cafeteria menu — Special: turkey and dressing. Entrees: baked meatloaf, liver and onions, barbecue spare ribs. Soup: beef noodles. Vegetables: Spanish rice, broccoli, buttered squash.

Wednesday

Threshold meeting — The Threshold Group will hold a general assembly meeting at 4 p.m. Aug. 14 in the Bldg. 30 auditorium. Updates on Threshold activities will be presented. Nominations for officer candidates will be open until Aug. 16. For more information call James Sturm, x33085.

Cafeteria menu — Special: Spanish macaroni. Entrees: broiled fish, tamales with chili. Soup: seafood

gumbo. Vegetables: ranch beans, beets, parsley potatoes.

Thursday

Asian Pacific program — The Asian Pacific American Program will host a panel discussion and cultural program at 1:30 p.m. Aug. 16 in Teague Auditorium. The panel, which includes JSC Human Resources Director Harvey Hartman, will discuss "Achieving Excellence in Space Activities: The Human Resources Perspectives." The cultural program will include ethnic dances, music and traditional bridal costumes. Call Pam Adams at x33761 for more information.

Cafeteria menu — Special: chicken fried steak. Entrees: beef pot roast, shrimp chop suey, pork chops. Soup: navy bean soup. Vegetables: carrots, cabbage, green beans.

Aug. 16

Cafeteria menu — Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

Aug. 19

Contract pricing seminar — The National Contract Management Association and the University of Houston-Clear Lake are co-sponsoring a seminar on "Estimating Cost and Pricing of Government Contracts" at 7:45 a.m. Aug. 19-21 at the UHCL Bayou Bldg., Rm. 2-532. Cost is \$150 per person, which includes course materials. For registration, call 283-3120 or 283-3122. For more information contact Jean Stell 283-3120.

Aug. 22

SCS meeting — The Society for Computer Simulation will meet at 11:45 a.m. Aug. 22 at the Lockheed Plaza 3 Bldg., first floor PIC Rm. JSC's Liz Bains will speak on the "Simulation System Branch." No reservations required. Lunch will be available. For more information, contact Wade Webster, 244-4306, or Robin Kirkham, 333-7345.

Aug. 27

BAPCO meeting — The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m., Aug. 27, at the League City Bank and Trust, 303 E. Main, League City. Contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019, for information.

"Beyond Excellence" workshops — Dr. B.L. Sommer, an authorized presenter of Tom Peter's lecture series, will host two "Beyond Excellence" workshops Aug. 27 at the Gilruth Center. Workshop 1, "Leadership Through Creativity and Innovation," will be from 8:30-11:30 a.m.. Workshop 2, "Lead, Follow, or Step Aside — The Art of Negotiation" will be from 1-4 p.m. Aug. 27. Registration will be handled the day of the workshop at the Gilruth Center. For more information, call Pam Adams, x33761.

Aug. 28

NMA meets — The National Management Association will meet at 5:30 p.m. Aug. 28 in the Gilruth Center ballroom. JSC Director Aaron Cohen will speak. Reservations are required by noon Aug. 21. For more information, call Valerie Burnham, x34210, or Carol Turner, x34182.

Steve, x30652 or 480-2998.

Infinity Quantum Jr. speakers, 12 in, 3 way, \$200 OBO; Reocent MTS TV Decoder, \$25 OBO; Connelly Comp II water ski 65 in w/carry case & vest, \$100 OBO. 286-1766.

IBM SW, Educational, Word Scramble, Play & Learn, age 7-11, Word customizing, w/manual, \$25; text books, for UH Central ELEE 6370/5440-ADV Digital Design, new cond. Youm, 283-4813.

Commodore 64 computer w/mod1541 DD, used approx 20 hrs, SW inc, \$300 OBO. (409) 945-7584.

Lloyds record player, two speakers, AM/FM radio, \$50. 946-7587.

Sony CD player, all manuals and packing. \$90. Barbara, x34474.

Mac Plus, 4MB RAM, 60MB HD, ImageWriter, ext FD, accessories, \$1.4K. 282-3580 or 488-3545.

IBM XT Clone w/color mon, 640K, 2.5 in FD, 30 MB HD, 2400 baud Hayes compatible, modem, \$600; color printer, \$185. Cheryl, x33958 or 437-1265.

Apple II Plus, like new, mono mon, extra games and controls, IBM printer, needs card for printer, \$450 OBO. Dick, 332-7082.

Mac Plus, 20M HD, 4MB RAM, ImageWriter II printer, plus ext drive, SW, ex cond, complete system, work all new SW. \$1.1K. 280-8796.

Musical Instruments

5 pc blk Pearl drum set, w/Zild cymbals, \$550. Blake, 337-2521.

Brandy Clarinet w/case, ex cond, \$175. Mary Lou, 333-7472 or 996-9534.

Programmable preset polyphonic synthesizer JX3P Roland, \$400; professional synthesizer Akai AX60, \$400. 480-9897.

1904 upright piano, wht, \$150; old elec organ, \$100 OBO. Lisa Taylor, 283-7545 or 286-5934.

Pets & Livestock

Show quality Rotweiler puppies, ex temperament, ready immediately for good home. 271-6633 or 723-6077.

Free male Dalmation, 15 mos old. 538-1669.

Free pure wht, pure bred, female German Shepherd, born 4/90. 946-5198.

Collies champion sire and dame, 1 tri-color rough female, 1 sable smooth male, \$165/ea. 484-7583.

Free kittens. 996-8610.

Free blk female kitten, 11 wks old. x37441.

Free miniature male Schnauzer, 2 yrs old. Ann, 283-5426.

Household

Queen sz sofa bed and LR chair, good cond, \$175; oriental rug, 9 x 12, \$100. x30446 or 338-2625.

Blk Lacquer LR and DR set, all ex cond. Leeann, 992-5210.

Sofa bed, king sz bed, dinette set, stereo center, coffee table, end tables, microwave, lamp, BBQ pit, knife block set, men's 40L suits. 333-5179.

Sears Kenmore washer and gas dryer, blk, computerized; Sears Kenmore refrig w/ice maker, dbl drs. x37796 or 326-1899.

Queen sz bed w/frame, good cond, \$100. 286-4913.

Rattan Bentwood style rocker, \$50; brass AX60, 2750.

King sz BR set, headboard, 6 drwr chest, 2 night stands, triple dresser w/2 mirrors, beige wood w/laminated trim, good cond, \$250. 283-1278 or 332-2265.

Maytag washer, wht, \$35; 2 office side arm waiting chairs \$20/ea. Richard, x36481 or 486-7245.

Dinette set, 7 pc, 6 wood/padded chairs, heavy wood grain laminate top, was \$329, now \$179; bunk beds w/matt, chest, new L shape sleep and dress cen-

ter, was \$780, now \$340; new wood desk w/chair, \$49. 337-5868.

2 bar stools, solid oak w/blue seat cushions, \$50/ea. x30554 or 486-4369.

Lazy Boy two seat recliner loveseat, ex cond, apricot, \$200. 482-5837.

Sofa, loveseat, square coffee table, end table, light oak finish, ex cond, \$400. 965-2988 or 991-6214.

Solid wood pecan finish triple dresser w/2 mirrors and 5 drwr chest, \$400; maple china cabinet, \$450. 485-7264.

Queen sz sleeper sofa, good cond, \$65. Barbara, 282-2879 or 482-1106.

Quasar convectional microwave, ex cond, \$350. Larry, x30428.

Contemporary sofa w/matching chair, beige, brn, wht, \$175. Terry, 283-6646 or 554-6631.

Full sz semi motionless, soft-sided water bed mattress w/htr, ex cond, \$75; wall wood platform, \$100; full sz bed and mattress, \$50; 8 drwr dresser w/mirror, \$100; night stand, \$50; small desk w/chair, \$75; all ex cond, all for \$250; gold recliner, \$50; rectangular glass/oak coffee table, \$40; exercise bike, \$25. Anne, x34493 or 286-2932.

Maytag washer, old but works, \$30; GE side-by-side refrig w/water and ice in door, \$300; refinished oak upright piano, \$175. x33335 or 326-2582.

Wanted

Want to rent garage apt, or share house, no children, pets, or smoking, can pay \$300 incl util, references. 333-5107.

Want kiln furniture and pottery supplies. Steve, 333-7819 or 334-1953.

Want riders for vanpool or carpool from the Woodlands and 1960 areas to JSC area. Bill Bell, 333-6678.

Want 3 wheeler or Quadrunner ATV in good cond, Quadrunner is preferred. Gary, 479-0306.

Want Yamaha "Wave Runner" dead or alive. Don, x

Recycling Life's Liquids

When astronauts wet their whistles on space station, it'll be as pure as at home

By Billie Deason

When Space Station *Freedom* astronauts pause for a drink of water, they'll know it's as pure as what they drink at home on Earth.

In time, NASA's work in recycling water could help increase the world's supply of clean drinking water and extend to other worlds when humans begin inhabiting lunar and Mars bases.

"Our standards for the recycled water on Space Station *Freedom* emulate the Environmental Protection Agency's requirements for potable, or drinking, water in the United States," said Dick Sauer, JSC's water quality manager in Space and Life Sciences' Medical Sciences Division.

Water quality is JSC's responsibility in the Work Package 2 Environmental Health System, one of three major components of *Freedom's* Crew Health Care System. JSC has established agencywide purity and monitoring requirements for all water systems used in the space program.

In partnership with Work Package 1, JSC's water experts reviewed test protocols and evaluated the procedures from medical and bioenvironmental engineering perspectives.

The Marshall Space Flight Center's Work Package 1 is responsible for devising and building the water recycling system itself as part of its overall role to develop a total Life Support System for the space station.

During the recently completed restructuring effort, the water system for Space Station *Freedom* was converted from a two-loop system that kept drinking water separate from hygiene water.

"The restructure combined those two loops so that we now have only one water quality," Sauer said. "It's all potable quality. The closed-loop water recycling system will take humidity condensate — the moisture recovered from human breathing and perspiration — urine, and wash water and process those streams into one type of water.

"Urine is pre-processed by running it through a vacuum compression distillation unit, which is

actually a rotating still. The distillate from that process is blended with humidity condensate and wash water and put through multimedia absorption beds which include filtration, ion exchange and granular activated carbon. Iodine is then added to provide microbiological control. Prior to consumption, the water stays in a tank for a specified time. That product water is potable," Sauer said.

As part of the planned Water Recovery Test, MSFC and its Work Package 1 prime contractor, Boeing, recently conducted taste tests of the potable product water recycled from humidity condensate.

Tasters rated two water samples without knowing whether they were tasting recycled water, tap water or samples of both. The recycled water earned high marks with at least one taster rating it higher than his tap water sample.

"Test subjects were medically screened before the project began to ensure they were without significant medical problems and physically able to participate in the exercise program we require," said Dr. Paul Hornyak, JSC's medical officer overseeing the Water Recovery Test.

Over the past several months, volunteers have tasted and washed in reprocessed water that they "donated" to the program in a special facility at MSFC built to simulate conditions on *Freedom*.

The to-be-recycled waste water was generated daily by volunteers participating in strenuous exercise, washing their exercise clothing and showering. The humidity within the facility is condensed and used as the source water for the potable water.

"The next phase of testing, called stage seven, will implement the single closed loop that

puts urine, hygiene water and humidity condensate together to become potable water," Hornyak said. "We don't expect any major problems. We've been able consistently to meet most specifications of the two-loop system.

"As for the psychological concerns, we have presented information to crew representatives and they have no reservations about drinking the water.

"The Denver, Colorado, municipal water department has done some work where they used waste water as a source for potable water. Their surveys indicated that if you show the

water is equivalent to what they're using at home — not better, just equivalent — customers have a fairly good level of acceptance," Hornyak said.

"After all, we're all drinking the same water dinosaurs drank

that you'd find on Earth resulting from agricultural runoff and industrial processes.

"So the types of potential chemicals that end up in potable water on the ground are probably entirely different from the ones we might find in space flight because the source water — humidity condensate, urine and hygiene water — will be so much more concentrated than the source water used for terrestrial potable water. The microbial quality of the water might be entirely different as well because of the closed loop environment we have," Sauer said.

Sauer expects the intensive testing of the closed-loop system in the early PMC phase may turn up some unexpected findings. Work Package 1 is responsible for the on-line instruments that will continuously analyze the water as it is recycled.

"It's like process control information. It immediately tells you if you have a problem," Sauer said.

Work Package 2 is developing the off-line instruments that perform thorough, medically oriented analyses.

"We see the initial on-orbit operation of the closed-loop system as the critical period," said John Straub, water quality engineer for Krug Life Sciences, the support contractor for Medical Science Division's water laboratory.

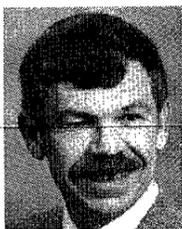
During the early checkout of the closed-loop system, in-depth water analyses will be conducted daily. Once the medical experts learn how well the equipment is operating and have reliable data proving its ability to meet water purity requirements, weekly detailed testing and reduced daily testing will become a regular maintenance task for *Freedom's* crew.

"We're not able to test on the ground under microgravity conditions. That's why it's critical during that system start-up period to do the kind of monitoring we have planned," Straub said. Both Hornyak and Sauer foresee benefits for the general public from the water recycling system. Hornyak believes developing countries could effectively use direct water recycling techniques while Sauer sees NASA as the leader in applying water recycling practices thereby creating acceptance for re-used water here on Earth.



Top: Dave Flanagan of Krug Life Sciences checks biofilm test systems in JSC's water lab. Coupons are inserted in two separate deionized water loops, one treated with iodine and one as it comes from the lab tap. After a specified period, coupons are analyzed for biofilm growth. Left: Dr. John Schultz, also of Krug, monitors an atomic absorption unit that determines ionic concentrations in water. Some metallic ions can be toxic if highly concentrated. Right: Sandy Carr of Krug operates an ion chromatograph that measures ions in water.

JSC Photos



'After all, we're all drinking the same water dinosaurs drank 65 million years ago. There's no new water being made.'

—Dick Sauer
JSC water quality manager

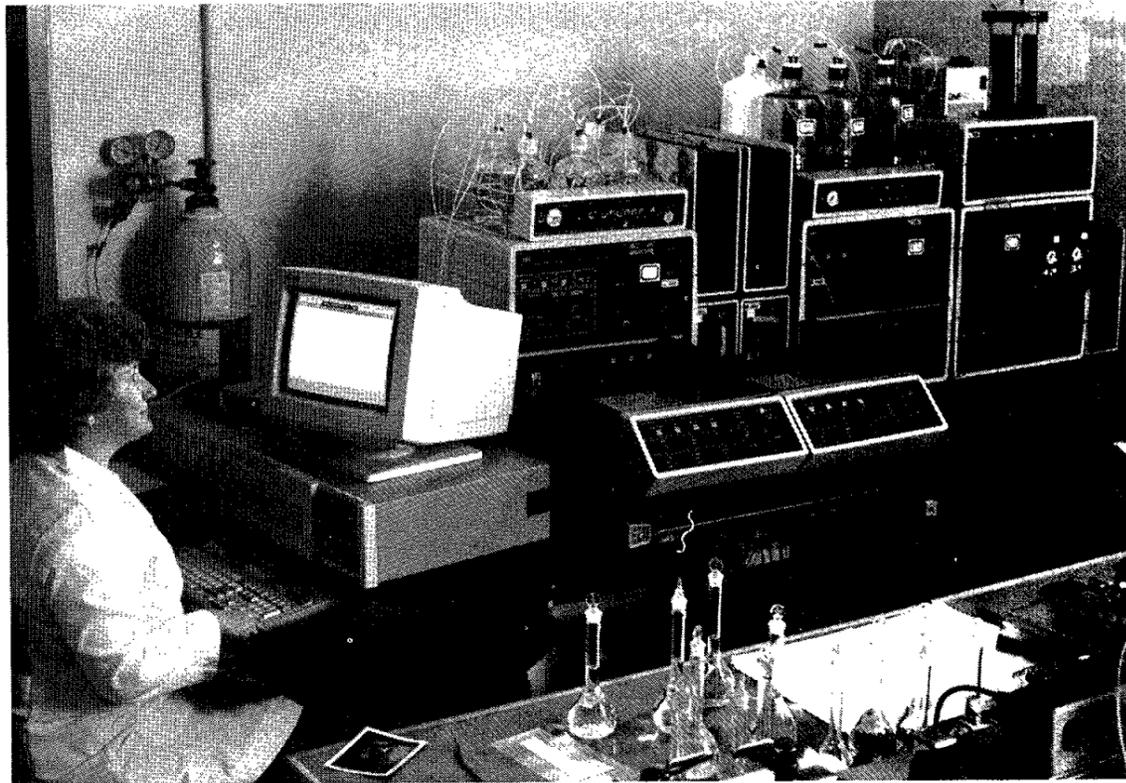
65 million years ago. There's no new water being made," Sauer said.

The MSFC test subjects all have strong scientific backgrounds.

"We'll be dealing with the same type individuals among astronaut crews, and they understand the technical facts of recycling water and are willing to accept it," Hornyak said. "We've had a really positive experience working with MSFC and Boeing on these tests," Hornyak said. "I'm very impressed with their expertise and facilities."

The JSC water analyses augment MSFC's work. Water testing for space station does include some sophisticated technologies not used by the EPA.

"We look at the non-routine type analyses which the EPA typically does not use in their analysis of potable water. We're looking for compounds not usually found in potable water. The EPA procedures are designed to find compounds



Abbey returns to JSC after Headquarters stint

George W.S. Abbey, former director of Flight Crew Operations, has rejoined JSC as Director Aaron Cohen's technical assistant for the Space Exploration Initiative.

Abbey, who originally joined JSC in 1964, is returning after two years at NASA Headquarters, first as deputy associate administrator for space flight, and then as deputy for operations of the Synthesis Group.

Abbey's most recent assignment was as the senior director for civil space at the National Space Council in Washington, D.C.

Womack accepts position in Space and Life Sciences

W. Dan Womack has been ap-

pointed assistant to the director for space shuttle in the Space and Life Sciences Directorate.

Womack will be responsible for managing the Space and Life

JSC

People

Sciences Directorate activities in the Space Shuttle Program. His most recent assignment was as mission manager for Spacelab Life Sciences-1 on STS-40, the first dedicated life sciences mission.

Womack, who joined JSC in 1963, served as a principal investi-

gator for experiments flown on Gemini spacecraft through 1966. He was manager for several projects in the Space Physics Division, Earth Observations Division, and the Earth Observations Aircraft Program Office until 1984.

Shaw finishes first in shuttle regatta

Flight Director Chuck Shaw recently sailed his yacht, "Confetti," to a first-place finish in the Space Shuttle Program Regatta in Galveston Bay.

The regatta, run last month, featured 10 yachts.

Norm Talbot of the Space Shuttle Ground Systems Division piloted "Runaway" to a second-place finish,



Abbey

Womack

Shaw

Barkis

and Harry Byington of the Space Shuttle Engineering Office earned third place on "Sea Dolly."

Barkis earns honors as top secretary

Monica R. Barkis, secretary for Safety, Reliability and Quality Assurance's Safety Division, recently received the Marilyn J. Bocking Award for Secretarial

Excellence.

Barkis, who provides all secretarial, clerical and administrative support to the division and deputy division chief and their staff, was applauded for handling a heavy workload in an efficient manner.

She was cited specifically for her work as the primary classified materials custodian for the division, and as the lead training coordinator for the SR&QA Office.

Belt tightening closes JSC Supply Warehouse

The JSC Supply Warehouse closed Monday because of budget uncertainties and severe restrictions that have been imposed on supply funds. It will remain closed until Oct. 1, the start of the next fiscal year.

Center Operations Deputy Director Grady McCright said that with the exception of standard-sized copy paper, all requests will be returned to originators without action.

Any exceptions must be considered mission critical or work stoppages, and must have the approval of the user's organization director and the concurrence of the director of Center Operations.

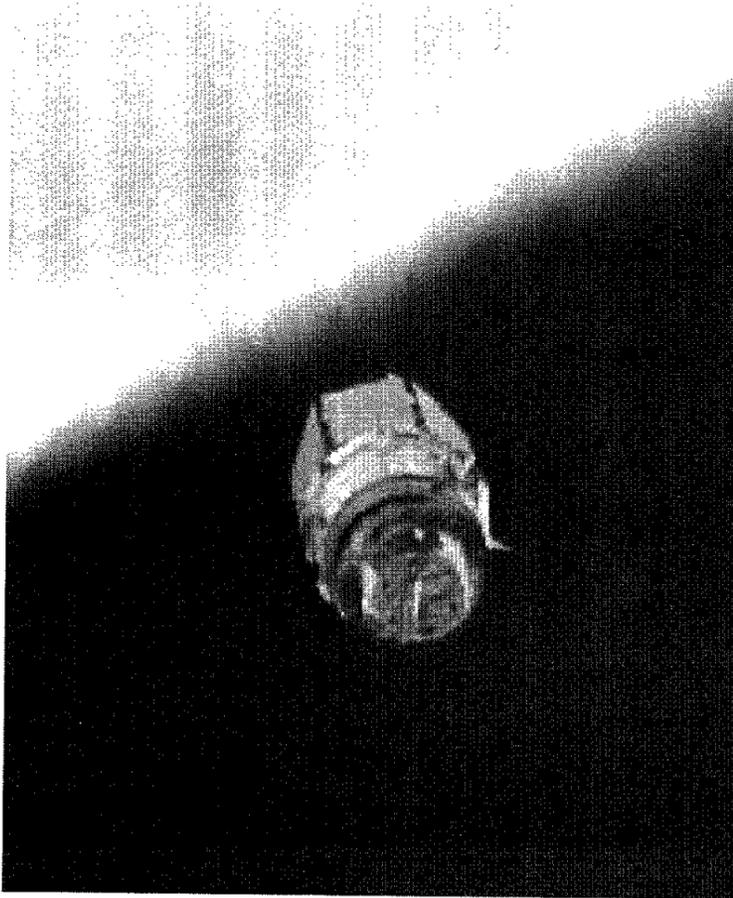
Anyone with questions should call John Rosales, x34840, or Linda Massey, x36656.

Video classes slated

JSC's interactive live television program will include two classes with Rice University this fall. The deadline for registration is Aug. 15.

The classes, "Digital System Design" and "Digital Sound Processing," are offered through the Rice Institute for Continuing Education in Engineering. They will be broadcast from a studio classroom, with interaction between teachers and students at a conference room at JSC.

Placement is competitive; applications will be available in Bldg. 45, Rm. 145. Call Laura Goerner at x33067 for more information.



NASA Electronic Photo

The fourth Tracking and Data Relay Satellite in the communications constellation drifts away from *Atlantis* following its Friday deployment. When its 60-to-90-day checkout is completed, TDRS-E will become TDRS-West in geosynchronous orbit at 174 degrees west longitude.

STS-43 crew photographs hurricanes

(Continued from Page 1)

"We've learned a lot with the technology advancements of the space program and we've applied them to improving the way we all live as human beings on the Earth," he said.

"Now that I've been in space a third time, it just reminds me as I watch David and Bakes, Shannon and Jim do all the research they're doing, how important space flight is, but yet how much more we could learn if we could be here on a full-time basis," he added. "Of course, in the next decade we plan to do that with our space station in partnership with the Japanese and the Europeans. With all those scientific brains working together, who knows the wonders and scientific breakthroughs that will occur in that decade?"

Another experiment that added to the knowledge base needed for long-

duration space flight was the Space Shuttle Combustion Experiment, which documented the characteristics of fire in microgravity. Adamson flipped a switch to ignite a 4.3-inch piece of ashless paper, which glowed brightly then settled down to a slow-moving rounded flame. It took about a minute for the flame to consume the paper.

Fire is a serious safety threat to spacecraft, and scientists hope SSCE will teach them how to best fight on-orbit flames.

Early in the mission, the crew sent down spectacular television shots of Hurricanes Fefa and Guillermo in the Pacific Ocean, but later in the mission they complained about obscured Earth observations visibility.

"Just this morning, John and I were looking out the window, and I

was commenting to him that this time the Earth looks very hazy," Lucid said. Both Lucid and Blaha are making their third shuttle flights; this makes Lucid the first woman to ever fly in space three times and Blaha the first astronaut to fly three times since the return to flight. "John agreed with me that we just haven't been getting as clear a view as we have on previous missions."

The crew did its part to help monitor Earth's environment by operating the Space Shuttle Backscatter Ultraviolet instrument. SSBUV took measurements of the atmosphere's ozone layer that will be used to calibrate identical instruments on orbiting satellites so that their readings will continue to paint an accurate picture of the atmospheric layer that protects the Earth's surface from the Sun's ultraviolet rays.

'This program is real and it's moving'

(Continued from Page 1)

and are typical of every program you have seen, but I have to say that through the past year or so the space station project has solved those problems," Cohen added.

Outlining the completion of the preliminary design review in July and station facilities construction projects completed or nearing completion, Cohen said, "this is not a paper program, this program is real and it's moving and it's going to be done."

Reaching the goal of having a useful, permanent outpost in space will be challenging, he said.

"We must redouble our efforts to get costs down and quality up and we must sharpen our sensitivity to

the needs of the scientific community and to the expectations of the American public," Cohen said.

Lenoir said the near-term challenge for a station capable of being evolved is getting started now.

"It's far better to do something, get started, figure out how to do it better and get better. That is what evolution is all about.

"Let's take our best shot at getting started and then let's learn. We're going to discover the questions early in the program, evolve and answer them," Lenoir said.

Freedom will help maintain United States leadership, he said, warning that we are in danger of giving away what was handed down to us.

"We were handed a position of leadership from our parents and grandparents. If we are not careful, we will consume it and hand our kids no leadership, but maybe some ideas on how to get it back," he said.

Reaching man-tended configuration with the station in the 1996 time frame is a prime goal of the program.

"The important thing is that we have a space station that we are using so that we can learn what the real questions are we should be asking," Lenoir said.

The three-day conference investigated strategies, concepts, user requirements, and growth potential for the international space station program.

JSC offers programming from Computer Channel

Starting today, the Human Resources Development Branch, the Information Systems Directorate and the Television Office will begin offering educational programming from The Computer Channel on site.

The programs, usually two hours long, discuss key trends in computers and teach conceptual understanding of various topics such as cooperative processing, local area networks, software engineering and systems development. They will be aired on Channel 5 of the JSC Television Distribution System.

Today's class will be "Managing Enterprise-wide PC Software, from 11:30 a.m.-1:30 p.m.

The Computer Channel develops, produces and distributes tele-

vision satellite programs specifically for the information systems community.

For detailed program and viewing information, call the Human Resources Development Branch at x35266 or the Regents Park Training Facility at 280-4800. Later this month, information about the programs will be available on the PROFS or All-In-One bulletin boards. If a conference room is available for viewing, it will be noted on the bulletin board.

A copy of the notes for each program may be picked up in Human Resources, Bldg. 45, Rm. 145, or the ISD Product Demonstration Facility, Bldg. 12, Rm. 112. Videotapes of the programs will be available for loan in the PDF a few days after the program airs.

Work package update

(Continued from Page 1)

including architectural control document updates, a change from AC to DC power, addition of the responsibility for secondary power distribution, addition of the Avionics Development Facility and a switch from hardware designed for flight to prototype.

The cost of the modification is \$597 million, making the new estimated value of the cost-plus-award-fee contract \$3.5 billion. The majority of the work will be performed at the McDonnell Douglas facilities in Huntington Beach and Houston.

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